

**NATIONWIDE EVALUATION OF
COMBINED SEWER OVERFLOWS AND URBAN STORMWATER DISCHARGES**

Volume II: Cost Assessment and Impacts

by

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Contract No. 68-03-0283

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This report has been reviewed by the Municipal Environmental Research Laboratory, US Environmental Protection Agency, and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the US Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

FOREWORD

The US Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natural environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development is that necessary first step in problem solution and it involves defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the prevention, treatment, and management of wastewater and solid and hazardous waste pollutant discharges from municipal and community sources, for the preservation and treatment of public drinking water supplies and to minimize the adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of that research; a most vital communications link between the researcher and the user community.

A nationwide evaluation of combined sewer overflows and stormwater discharges can be used by policy makers in allocating resources among various environmental management programs. This report estimates, for urban areas in the United States, the population and area served by type of sewerage system; the quantity and quality of stormwater discharges from these areas; the cost for various levels of control either as a single purpose program or as a multiple purpose program wherein some of the costs are assigned to dry-weather sewage treatment and/or urban storm drainage; and evaluates receiving water impacts for a test city, Des Moines, Iowa.

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ABSTRACT

A nationwide assessment has been made of the quantity and quality of urban storm flow emanating from combined sewers, storm sewers, and unsewered portions of all 248 urbanized areas and other urban areas in the United States. Available control alternatives and their associated costs were also determined. Continuous simulation runs using one year of hourly data were made to determine the attainable level of pollution control with a specified availability of storage volume and treatment rate in five cities: Atlanta, Denver, Minneapolis, San Francisco, and Washington, DC. This procedure was used to derive generalized equations relating pollution control to storage and treatment. These results were combined into a simple optimization model which determined the optimal mix of storage and treatment for any feasible level of control for any city. Then the nationwide assessment is presented. The results indicate annual costs ranging from \$297 million for 25 percent pollution control to \$5,029 million for 85 percent pollution control. The corresponding initial capital investment ranges from \$2,476 million for 25 percent control to \$41,900 million for 85 percent control. These costs can be reduced significantly if stormwater pollution control is integrated with best management practices and integrated into a multi-purpose program.

The entire results from this project are contained in the three volumes listed below:

1. American Public Works Association and University of Florida,
Nationwide Evaluation of Combined Sewer Overflows and Urban Stormwater Discharges: Volume I, Executive Summary, USEPA, 1977.
2. Heaney, J. P., W. C. Huber, M. A. Medina, Jr., M. P. Murphy, S. J. Nix, and S. M. Hasan, Nationwide Evaluation of Combined Sewer Overflows and Urban Stormwater Discharges: Volume II, Cost Assessment and Impacts, USEPA, 1977.
3. Sullivan, R. H., M. J. Manning, and T. M. Kipp, Nationwide Evaluation of Combined Sewer Overflows and Urban Stormwater Discharges: Volume III, Characterization of Discharges, USEPA, 1977.

This report is submitted in fulfillment of Contract No. 68-03-0283 by the American Public Works Association and the University of Florida under sponsorship of the US Environmental Protection Agency. Work was completed in November, 1976.

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ACKNOWLEDGMENTS

This volume is one part of a joint effort between the American Public Works Association of Chicago and the University of Florida. The cooperation of Martin Manning, former project director for APWA and William F. Henson of APWA was very helpful. Richard H. Sullivan of APWA provided overall project coordination and management. The advice and guidance of our advisory committees on this US assessment and the Canadian assessment were very useful.

Richard Field of USEPA provided invaluable overall guidance and detailed critical review of findings throughout the study.

Numerous persons at the University of Florida contributed to this effort. Michael Fladmark and Dave Wolters coded and checked the input data for the 248 urbanized areas. Henry Malec did the initial work of deriving the isoquant equations. Gordon Quesenberry developed the storm event definition. Typing of the numerous drafts and final report was done by Ms. Mary Polinski who deserved special credit for her patience and persistence in completing the manuscript.